

72. (Amended) The integrated circuit of claim 69, wherein the second electrode includes [only] a tungsten nitride layer, and the tungsten nitride layer includes silicon.

REMARKS

Applicant has carefully reviewed and considered the Office Action mailed on July 18, 2002. Claims 41 - 42, 46, 49 - 50, 52, 55 - 56, 58, 61 - 64, 66 and 69 - 72 are amended. Claims 38 - 74 remain pending in this application.

In various embodiments of the present subject matter, the chemical vapor deposition of the tungsten nitride uses a source gas that includes a silicon-based gas. The amendments in the marked up set of claims clarify that, as recited in the claims, the tungsten nitride layer / tungsten nitride film includes silicon. Support for these amendments is found at least on page 6, lines 7 - 9 and on page 7, lines 1 - 4 of the specification.

§102 Rejection of the Claims

Claims 41, 43 - 48, 51, 58 and 60 were rejected under 35 USC § 102(b) as being clearly anticipated by Matsuhashi (JP 406275776 A).

With respect to amended independent claim 41, Applicant is unable to find, among other things, in the Matsuhashi reference a capacitor having a tungsten nitride layer that includes silicon, as recited in the claim. Claims 42 - 45 depend on amended independent claim 41, and further define the present subject matter. Thus, claims 42 - 45 are believed to be patentable at least for the reasons provided with respect to claim 41.

With respect to amended independent claim 46, Applicant is unable to find, among other things, in the Matsuhashi reference a capacitor comprising a second electrode formed as a layer of tungsten nitride that includes silicon, as recited in the claim. Claims 47 - 51 depend on amended independent claim 46, and further define the present subject matter. Thus, claims 47 - 51 are believed to be patentable at least for the reasons provided with respect to claim 41.

With respect to amended independent claim 58, Applicant is unable to find, among other things, in the Matsuhashi reference a capacitor comprising a film of tungsten nitride that includes silicon, as recited in the claim. Claims 59 - 61 depend on amended independent claim 58, and

further define the present subject matter. Thus, claims 59 - 61 are believed to be patentable at least for the reasons provided with respect to claim 58.

Applicant respectfully requests withdrawal of the rejection, and reconsideration and allowance of claims 41, 43 - 48, 51, 58 and 60.

§103 Rejection of the Claims

Claims 38 - 40, 42, 49, 50, 52 - 57, 59 and 61 were rejected under 35 USC § 103(a) as being unpatentable over Matsuhashi.

Applicant respectfully traverses the single reference rejection under § 103. Should the Examiner maintain the rejection, Applicant requests the Examiner to cite references in support of the rejection pursuant to M.P.E.P. 2144.03.

With respect to independent claim 38, Applicant is unable to find, among other things, in the Matsuhashi reference a showing or suggestion of a capacitor comprising a second electrode formed of chemically vapor deposited tungsten nitride in which the tungsten nitride is formed using a gas comprising nitride, tungsten and silicon, as recited in the claim. This process results in a tungsten nitride layer that includes silicon. The silicon reduces encroachment into any silicon based materials exposed to the tungsten nitride, improves adhesion of the tungsten nitride to its underlying layer, and reduces the bulk resistivity of the tungsten nitride (Specification at page 7, lines 1-4). Claims 39 - 40 depend on independent claim 38, and further define the present subject matter. Thus, claims 39 - 40 are believed to be patentable at least for the reasons provided with respect to claim 38.

Applicant notes that claim 42 depends on claim 41 and further defines the present subject matter. Thus, claim 42 is believed to be patentable at least for the reasons provided with respect to claim 41. Additionally, Applicant respectfully disagrees with the characterization that forming both electrodes to include tungsten nitride involves a rearrangement of parts.

Applicant notes that claims 49 - 50 depend on claim 46 and further define the present subject matter. Thus, claims 49 - 50 are believed to be patentable at least for the reasons provided with respect to claim 46. Additionally, with respect to claim 50, Applicant is unable to find, among other things, in the Matsuhashi reference a showing or suggestion that the layer of

tungsten nitride is exposed to silicon based materials, and a tungsten nitride / silicon based material boundary is characterized by a reduced encroachment of the tungsten nitride into the silicon based materials, as recited in the claim.

With respect to amended independent claim 52, Applicant is unable to find, among other things, in the Matsuhashi reference a showing or suggestion of a capacitor comprising a first electrode formed as a layer of tungsten nitride in which the layer tungsten nitride includes silicon, as recited in the claim. Claims 53 - 57 depend on independent claim 52, and further define the present subject matter. Thus, claims 53 - 57 are believed to be patentable at least for the reasons provided with respect to claim 52.

Applicant notes that claims 59 and 61 depend on claim 58 and further define the present subject matter. Thus, claims 59 and 61 are believed to be patentable at least for the reasons provided with respect to claim 58.

Applicant respectfully requests withdrawal of the rejection, and reconsideration and allowance of claims 38 - 40, 42, 49, 50, 52 - 57, 59 and 61.

Claims 62 - 74 were rejected under 35 USC § 103(a) as being unpatentable over Matsuhashi in view of Wolf, *Silicon Processing for the VLSI Era*, Vol. 2: Process Integration.

With respect to amended independent claim 62, Applicant is unable to find, among other things, in the Matsuhashi and Wolf references a showing or suggestion of a capacitor comprising a film of tungsten nitride that includes silicon, as recited in the claim. Claims 63 - 65 depend on independent claim 62, and further define the present subject matter. Thus, claims 63 - 65 are believed to be patentable at least for the reasons provided with respect to claim 62.

With respect to amended independent claim 66, Applicant is unable to find, among other things, in the Matsuhashi and Wolf references a showing or suggestion of a capacitor comprising a film of tungsten nitride formed using: ammonia; tungsten hexaflouride or tungsten carbonyl; and silane, organic silane or a compound that is a multiple order of silane, as recited in the claim. This process results in a tungsten nitride layer that includes silicon. The silicon reduces encroachment into any silicon based materials exposed to the tungsten nitride, improves adhesion of the tungsten nitride to its underlying layer, and reduces the bulk resistivity of the tungsten

nitride (Specification at page 7, lines 1-4). Claims 67 - 68 depend on independent claim 66, and further define the present subject matter. Thus, claims 67 - 68 are believed to be patentable at least for the reasons provided with respect to claim 66.

With respect to amended independent claim 69, Applicant is unable to find, among other things, in the Matsuhashi and Wolf references a showing or suggestion of a non-planar capacitor where an electrode includes a tungsten nitride layer, and the tungsten nitride layer includes silicon, as recited in the claim. Claims 70 - 74 depend on independent claim 66, and further define the present subject matter. Thus, claims 70 - 74 are believed to be patentable at least for the reasons provided with respect to claim 69.

Applicant respectfully requests withdrawal of the rejection, and reconsideration and allowance of claims 62 - 74.

Conclusion

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney (612- 373-6960) to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

SCOTT G. MEIKLE ET AL.

By their Representatives,

SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.
P.O. Box 2938
Minneapolis, MN 55402
(612) 373-6960

Date 10-18-02

By



Marvin L. Beekman

Reg. No. 38,377

CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Commissioner of Patents, Washington, D.C. 20231, on this 18th day of October, 2002.

Name

Amy Moriarty

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